

SCIENCE ABSTRACTS

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SECTION A.—PHYSICS

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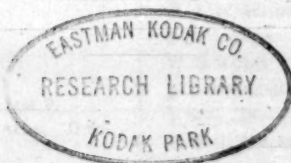
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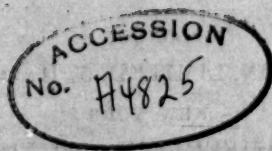
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ERRATA.

SECTION A.—PHYSICS.

- Abstract No. 1620 (1931), line 8; *for* maximum, *read* minimum, and line 9; *for* minimum *read* maximum.
Abstract No. 470, line 2; *delete* Hestha Ayrton and S. T. Fellow.
Abstract No. 569, line 2; *for* Bicard, *read* Biquard.
Abstract No. 787, line 2; *for* Journ. *read* Rev.
Abstract No. 920, line 1; *for* Calaxies, *read* Galaxies.
Abstract No. 1365, line 1; *for* Comet 1917 II, *read* Comet 1917 I.
Abstract No. 1507, line 1; *for* Anhydrides, *read* Hydrides.
Abstract No. 1766, line 2; *for* electrotypes, *read* electrolytes.
Abstract No. 3825, line 7; *for* 2626 (1933), *read* 2616 (1933).
Abstract No. 4569, line 1; *for* Kollosowsky, *read* Kolossowsky.
Abstract No. 5258, line 3; *for* Abstract 4374 (1933), *read* Abstract 4374 (1932).
Abstract No. 5337, line 13; *for* $[\text{CoCl}_4]^-$, *read* $[\text{CoCl}_4]^{2-}$.

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LIST OF JOURNALS AND THEIR ABBREVIATIONS

An asterisk () indicates that the Journals so marked are received only occasionally.*

ABBREVIATION.	FULL TITLE AND ADDRESS.
Acad. Polonaise Sci. et Lettres, Bull.	Bulletin International de l'Academie des Sciences et des Lettres. Gebethner et Wolff, Rynek Gl., Cracovie, Poland.
Accad. d'Italia, Mem.	Memorie della Reale Accademia d'Italia, Rome, Italy.
Accad. Lincei, Atti	Atti della Reale Accademia Nazionale dei Lincei. Dott. Giovanni Bardi, Piazza Madama 19-20, Rome (111), Italy.
Accad. Sci. Torino, Atti	Atti della Reale Accademia delle Scienze di Torino. Libreria Fratelli Bocca, Via Carlo Alberto 3, Turin, Italy.
A.C.E.C.	Ateliers de Constructions Électriques de Charleroi. Route de Philippeville, Charleroi, Belgium.
Acoustical Soc. of America, J.	Journal of the Acoustical Society of America. The American Institute of Physics, 11, East 38th Street, New York, U.S.A.
Acta Physica Polonica	Acta Physica Polonica, Institut de Physique Experimentale de l'Université, 69, rue Hoza, Warsaw, Poland.
A.E.G. Mitt	A.E.G. Mitteilungen. Die technische Auskunftstelle der A.E.G. Friedrich-Karl-Ufer 2-4, Berlin, N.W.40.
A.I.E.E., Trans.	Quarterly Transactions of the American Institute of Electrical Engineers, 33, West 39th Street, New York, U.S.A.
Akad. Wiss. Wien, Ber.	Sitzungsberichte der Akademie der Wissenschaften in Wien. Mathematisch-naturwissenschaftliche Klasse. Universitätsplatz 2, Vienna I.
Alta Frequenza	Alta Frequenza. Associazione Elettrotecnica Italiana, Via San Paolo N.10, Milan (2/2), Italy.
Am. Acad., Proc.	Proceedings of the American Academy of Arts and Sciences. 28, Newbury Street, Boston, Mass., U.S.A.
*Am. Assoc. Petroleum Geologists, Bull.	Bulletin of the American Association of Petroleum Geologists. 605, Tulsa Building, Tulsa, Oklahoma, U.S.A.
Am. Chem. Soc., J.	Journal of the American Chemical Society. Charles L. Parsons, Mills Building, Washington, D.C., U.S.A.
Am. Electrochem. Soc., Trans.	Transactions of the American Electrochemical Society. Columbia University, New York, U.S.A.
Am. Geophys. Union, Trans.	Transactions of the American Geophysical Union, National Research Council, Constitution Avenue and 21st Streets, Washington, D.C., U.S.A.
Am. Illum. Eng. Soc., Trans.	Transactions of the American Illuminating Engineering Society, Mt. Royal & Guilford Aves., Baltimore, Maryland, U.S.A.
Am. J. Sci.	American Journal of Science. New Haven, Connecticut, U.S.A.

ABBREVIATION.	FULL TITLE AND ADDRESS.
Am. J. of Roentgenology and Radium Therapy	The American Journal of Roentgenology and Radium Therapy. Charles C. Thomas, 220, East Monroe Street, Springfield, Illinois, U.S.A.
Am. Phil. Soc., Proc.	Proceedings of the American Philosophical Society. 104, South 5th Street, Philadelphia, Pa., U.S.A.
Am. Phys. Teacher	The American Physics Teacher. The American Institute of Physics, 11, East 38th Street, New York, U.S.A.
Ann. d. Physik	Annalen der Physik. J. A. Barth. Salomonstrasse 18B, Leipzig, C1, Germany.
Ann. de Physique	Annales de Physique. Masson et Cie, Libraires de l'Académie de Médecine, 120, Boulevard Saint-Germain, Paris (VI*).
Ann. Soc. Sci. de Bruxelles	Annales de la Société Scientifique de Bruxelles. 2, Rue de Manège, Louvain, Belgium.
Annales des P.T.T.	Annales des Postes, Télégraphes et Téléphones. Librairie de l'Enseignement Technique, 3, Rue Thénard, Paris (5*).
Arch. des Sciences	Archives des Sciences Physiques et Naturelles. Institut de Physique de l'Université, Geneva, Switzerland.
Arch. f. Elektrot	Archiv für Elektrotechnik. J. Springer, Linkstrasse 23-24, Berlin, W.9.
Arkiv f. Kem. Min. och Geologie, Stockholm	Arkiv för Kemi, Mineralogi och Geologie, Almqvist and Wiksells Boktryckeri-A.-B., Stockholm, Sweden.
Arkiv f. Mat., Astron., och Fysik, Stockholm	Arkiv för Matematik, Astronomi, och Fysik. Almqvist & Wiksells Boktryckeri-A.-B., Stockholm, and Wheldon and Wesley, Ltd., 2, 3 and 4, Arthur Street, London, W.C.2.
A.S.E.A.J.	A.S.E.A. Journal. Allmänna Svenska Elektriska A.B., Westeras, Sweden, and A.S.E.A. Electric Ltd., 5, Chancery Lane, London, W.C.2.
Assoc. Ing. El. Liège, Bull.	Bulletin de l'Association des Ingénieurs Electriciens sortis de l'Institut Electrotechnique Montefiore. 31, Rue Saint Gilles, Liège, Belgium.
*Assoc. d'Océanographie Physique, Publ. Scientifiques	Association d'Océanographie Physique. Union Géodésique et Géophysique Internationale. Frenckellska Tryckeri Aktiebolaget, Helsingfors, Finland.
Assoc. Suisse Élect., Bull.	Association Suisse des Electriciens Bulletin. Secretariat General de l'A.S.E. et de l'U.C.S., Seefeldstrasse 301, Zürich 8, Switzerland.
Astron. Iakttagelser och Undersökning, Stockholms, Obs.	Astronomiska Iakttagelser och Undersökningar Å Stockholms Observatorium. Almqvist and Wiksells Boktryckeri-A.-B., Stockholm, Sweden.
Astron. J.	The Astronomical Journal. Dudley Observatory, Albany, New York, U.S.A.
Astrophys. J.	The Astrophysical Journal. The University of Chicago Press, 5750 Ellis Avenue, Chicago, Illinois, U.S.A.
A.T.M.	Archiv für technisches Messen. R. Oldenbourg, Glückstrasse 8, Munich 32, Germany.
Beitr. z. angew. Geophys. (Formerly Gerlands Beitr. z. Geophys., Angew. Geophys.)	Beiträge zur Angewandten Geophysik. Akademische Verlagsgesellschaft m.b.H., Markgrafenstrasse 6, Leipzig, C1, Germany.
Bell System Techn. J.	Bell System Technical Journal. The American Telephone and Telegraph Co., 195, Broadway, New York, U.S.A.
Bell Telephone Quarterly	Bell Telephone Quarterly. The American Telephone and Telegraph Company, 195, Broadway, New York, U.S.A.

ABBREVIATION.	FULL TITLE AND ADDRESS.
Brit. J. of Radiology	The British Journal of Radiology. The British Institute of Radiology, 32, Welbeck Street, London, W.1.
Brown Boveri Rev.	The Brown Boveri Review. Richardsons Westgarth-Brown Boveri, Ltd., 56, Victoria Street, London, S.W.1.
Bull. Astronomique	Bulletin Astronomique. Gauthier-Villars et Cie, Quai des Grands-Augustins 55, Paris.
Bull. géodésique	Bulletin géodésique. Organe de l'Association de Géodésie de l'Union Géodésique et Géophysique Internationale. Rue d'Anjou, 78, Paris (8 ^e).
Bull. Oerlikon	Bulletin Oerlikon. Oerlikon, Ltd., Victoria House, Southampton Row, London, W.C.1.
Bureau of Mines, Bull., Economic Papers and Techn. Papers	Publications of the Bureau of Mines. U.S. Department of Commerce, Superintendent of Documents, Government Printing Office, Washington, D.C., U.S.A.
Bureau of Standards, Circ. & Misc. Publ.	Publications of the Bureau of Standards. Superintendent of Documents, Government Printing Office, Washington, D.C., U.S.A.
Bureau of Standards, J. of Research	Bureau of Standards, Journal of Research. Superintendent of Documents, Government Printing Office, Washington, D.C., U.S.A.
Calcutta Math. Soc., Bull.	Bulletin of the Calcutta Mathematical Society. H. P. Banerjee, M.Sc., 53/1, Shambazar Street, Calcutta, India.
Cambridge Phil. Soc., Proc.	Proceedings of the Cambridge Philosophical Society. The Cambridge University Press, Fetter Lane, E.C.4.
Canad. J. of Research	Canadian Journal of Research. National Research Council of Canada, Ottawa, Canada.
Chem. Soc., J.	Journal of the Chemical Society. The Chemical Society, Burlington House, Piccadilly, London, W.1.
Chem. Soc. Japan, Bull.	Bulletin of the Chemical Society of Japan. Faculty of Science, Imperial University of Tokyo, Japan.
*Chem. Trade J.	Chemical Trade Journal. Davis Bros., 265, Strand, London, W.C.2.
*Chinese Chem. Soc. J.	Journal of the Chinese Chemical Society. Department of Chemistry, National University of Peking, China.
Coast and Geodetic Survey, Special Publ.	Coast and Geodetic Survey. Special Publications. U.S. Department of Commerce, Superintendent of Documents, Government Printing Office, Washington, D.C., U.S.A.
Colliery Guardian	The Colliery Guardian. 30 and 31, Fumival Street, Holborn, London, E.C.4.
Com. Naz. Italiano, Geod. e. Geofis., Boll.	Bollettino del Comitato Nazionale Italiano per la Geodesia e la Geofisica. Prof. G. Cassinis, R. Scuola di Ingegneria, Pisa, Italy.
Comptes Rendus	Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences. Gauthier-Villars et Cie, Quai des Grands-Augustins 55, Paris (6 ^e).
Comptes Rendus de l'Acad. des Sciences, U.S.S.R.	Comptes Rendus de l'Académie des Sciences, Solar Commission, Leningrad, U.S.S.R.
Cornell Univ. Eng. Experiment Sta., Bull.	Bulletin of the Engineering Experiment Station, College of Engineering, Cornell University, Ithaca, New York, U.S.A.

ABBREVIATION.	FULL TITLE AND ADDRESS.
Dept. Sci. & Indust. Research, Publ.	Publications of the Department of Scientific and Industrial Research, 16, Old Queen Street, London, S.W.1.
Die Physik.	Die Physik. J. A. Barth, Salomonstrasse 18B. Leipzig, C1, Germany.
Dominion Astrophys. Obs. Victoria, Publ.	Publications of the Dominion Astrophysical Observatory, Victoria. Victoria, B.C., Canada.
Dominion Observat., Ottawa, Publ.	Publications of the Dominion Observatory, Ottawa. Department of the Interior, Ottawa, Canada.
El. Rev.	The Electrical Review. Dorset House, Stamford Street, London, S.E.1.
El. Rly., Bus and Tram J.	The Electric Railway, Bus and Tram Journal. Avenue Chambers, Vernon Place, Southampton Row, London, W.C.1.
El. Times.	The Electrical Times. Sardinia House, Kingsway, London, W.C.2.
El. World.	Electrical World. McGraw-Hill Publishing Co., Inc., 330, West 42nd Street, New York, U.S.A., and Aldwych House, London, W.C.2.
Elect. Communication.	Electrical Communication. International Standard Electric Corporation, 67, Broad Street, New York, U.S.A., and Connaught House, Aldwych, London, W.C.2.
Elect. Engineering.	Electrical Engineering. Journal of the American Institute of Electrical Engineers, 33, West 39th Street, New York, U.S.A.
Elect. J.	The Electric Journal. 530, Fernando Street, Pittsburg, Pa., U.S.A.
Electrician.	The Electrician. Bouverie House, 154, Fleet Street, London, E.C.4.
Electronics.	Electronics. The McGraw-Hill Publishing Co., Inc., 330, West 42nd Street, New York, U.S.A., and Aldwych House, London, W.C.2.
Electrot. Laborat. Tokyo, Japan, Circ.	Circulars of the Electrotechnical Laboratory, Tokyo, Japan. Electrotechnical Laboratory, Ministry of Communications, Tokyo, Japan.
Electrot. Laborat. Tokyo, Japan, Researches	Researches of the Electrotechnical Laboratory, Tokyo, Japan. Electrotechnical Laboratory, Ministry of Communications, Tokyo, Japan.
Elek. Betrieb.	R.E.A. der Elektrische Betrieb. Georg Siemens, Kurfürstenstrasse 2, Berlin, W.57.
Elek. im Bergbau.	Elektrizität im Bergbau. R. Oldenbourg, Glückstrasse 8, Munich 32, Germany.
E.N.T.	Elektrische Nachrichten-technik. J. Springer, Linkstrasse 23-24, Berlin, W.9.
E.T.Z.	Elektrotechnische Zeitschrift. J. Springer, Linkstrasse 23-24, Berlin, W.9.
E. u. M.	Elektrotechnik und Maschinenbau. Theobaldgasse 12, Vienna 6, Austria.
Elettrotecnica.	L'Elettrotecnica. Giornale ed Atti dell'Associazione Elettrotecnica Italiana, Via S. Paolo 10, Milan (103), Italy.
Engineer.	The Engineer. 28, Essex Street, Strand, London, W.C.2.
Engineering.	Engineering. 35 and 36, Bedford Street, Strand, London, W.C.2.
Ergeb. d. exakt. Naturwiss.	Ergebnisse der exakten Naturwissenschaften. Hirschwaldsche Buchhandlung, Unter den Linden 68, Berlin, N.W.7.

ABBREVIATION.	FULL TITLE AND ADDRESS.
Ericsson Rev.	Ericsson Review. Telefonaktiebolaget. L. M. Ericsson, Kungsgatan 33, Stockholm, Sweden.
Ericsson Technica.	Ericsson Technics. Telefonaktiebolaget. L. M. Ericsson, Kungsgatan 33, Stockholm, Sweden.
Faraday Soc., Trans.	Transactions of the Faraday Society. Gurney and Jackson, 33, Paternoster Row, London, E.C.4.
Fot. Indust. (formerly Phot. Indust.)	Fotografische Industrie. Verlag der Union Verlagsgesellschaft. Zweigniederlassung, Krausenstrasse 35-36, Berlin, S.W.19.
Frank. Inst., J.	Journal of the Franklin Institute. The Franklin Institute of the State of Pennsylvania, 15, South Seventh Street, Philadelphia, Pa., U.S.A.
G.E.C. J.	G.E.C. Journal. The General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.
Gen. El. Rev.	General Electric Review. The General Electric Co., Schenectady, New York, U.S.A., and Crown House, Aldwych, London, W.C.2.
Geofysiske Publ.	Geofysiske Publikasjoner. Direktor Th. Hesselberg, Det Norske Meteorologiske Institutt, Oslo, Norway.
Geolog. Mag.	The Geological Magazine. Dulau & Co., Ltd., 32, Old Bond Street, London, W.1.
*Geolog. Rundschau.	Geologische Rundschau, Leipzig, Germany.
*Geophys. Mag., Tokyo.	The Geophysical Magazine. The Central Meteorological Office, Tokyo, Japan.
Gerlands Beitr. z. Geophys.	Gerlands Beiträge zur Geophysik. Akademische Verlagsgesellschaft m.b.H., Markgrafenstrasse 6, Leipzig, C1, Germany.
Gerlands Beitr. z. Geophys., Angew. Geophys. (Now Beitr. z. angew. Geophys.)	Gerlands Beiträge zur Geophysik. Ergänzungshefte für angewandte Geophysik.
Göttingen Nachrichten, Math. Phys. Keasse	Nachrichten von der Gesellschaft der Wissenschaften zu Göttingen. Mathematisch-Physikalische Klasse. Weidmannsche Buchhandlung, Berlin.
Harvard Coll. Obs., Ann.	Annals of the Harvard College Observatory. The Observatory, Cambridge, Mass., U.S.A.
Harvard Coll. Obs., Bull.	Bulletin of the Harvard College Observatory. The Observatory, Cambridge, Mass., U.S.A.
Harvard Coll. Obs., Circ.	Circular of the Harvard College Observatory. The Observatory, Cambridge, Mass., U.S.A.
Helv. Phys. Acta	Helvetica Physica Acta. E. Birkhäuser et Cie, Bâle, Switzerland.
Hiroshima Journ. Sci.	Journal of Science of the Hiroshima University. Hiroshima University, Hiroshima, Japan.
Hochfrequenztechn. u. Elektroakustik	Hochfrequenztechnik und Elektroakustik, Akademische Verlagsgesellschaft m.b.H., Markgrafenstrasse 6, Leipzig, C1, Germany.
Hokkaido Imp. Univ., Eng. Mem.	Memoirs of the Faculty of Engineering. Hokkaido Imperial University, Sapporo, Japan.
I.E.E., J.	Journal of the Institution of Electrical Engineers. Savoy Place, Victoria Embankment, London, W.C.2.
I.E.E., Japan, J.	Journal of the Institution of Electrical Engineers of Japan, The Denki-Gakkwai, No. 3, 1-Chome, Yûrakuchô, Kôjinhachi-ku, Tokyo, Japan.

ABBREVIATION	FULL TITLE AND ADDRESS
I.E.E., Students' J.	Students' Quarterly Journal. The Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C.2.
Illum. Eng., London	The Illuminating Engineer. The Journal of Good Lighting. 32, Victoria Street, London, S.W.1.
Imp. Acad. Tokyo, Proc.	Proceedings of the Imperial Academy of Science, Tokyo, Ueno Park, Tokyo, Japan.
Imp. Marine Obs., Kobe, Japan, Mem.	Memoirs of the Imperial Marine Observatory, Kobe, Japan.
India Meteorolog. Dept., Mem.	Memoirs of the India Meteorological Department. The Manager of Publications, Civil Lines, Delhi, and the Office of the High Commissioner for India, India House, Aldwych, London, W.C.2.
India Meteorolog. Dept., Sci. Notes	Scientific Notes of the India Meteorological Department, The Manager of Publications, Civil Lines, Delhi, and the Office of the High Commissioner for India, India House, Aldwych, London, W.C.2.
Indian Journ. Phys.	Indian Journal of Physics and Proceedings of the Indian Association for the Cultivation of Science. 210, Bow-Bazar Street, Calcutta, India.
Indian Phys.-Math., J.	Indian Physico-Mathematical Journal. J. Ghosh, University of Dacca, Bengal, India.
Indust. and Engin. Chem.	Industrial and Engineering Chemistry. The American Chemical Society. Charles L. Parsons, Mills Building, Washington, D.C., U.S.A.
Indust. & Engin. Chem. (Analytical Edition)	Industrial & Engineering Chemistry (Analytical Edition). The American Chemical Society, Charles L. Parsons, Mills Building, Washington, D.C., U.S.A.
Ingegnere	L'Ingegnere. Rivista Tecnica Sindacato Nazionale Fascista Ingegneri, Via Vittorio Veneto, 7, Casella Postale 482, Rome 105, Italy.
*Ingeniorvidenskab. Skrifter	Ingeniorvidenskabelige Skrifter. G.E.C. Gad, Vimmelskaffet 32, Copenhagen, Denmark.
Inst. Automobile Eng., J.	Journal of the Institution of Automobile Engineers, Watergate House, York Buildings, Adelphi, W.C.2.
Inst. Civ. Eng., Proc.	Proceedings of the Institution of Civil Engineers. Great George Street, Westminster, London, S.W.1.
Inst. Eng. & Shipbuilders, Trans.	Transactions of the Institution of Engineers and Shipbuilders in Scotland. Elmbank Crescent, Glasgow, Scotland.
Inst. Eng., Australia, J.	Journal of the Institution of Engineers, Australia. Science House, Gloucester and Essex Streets, Sydney, New South Wales, Australia.
Inst. Mech. Eng., Proc.	Proceedings of the Institution of Mechanical Engineers. Storey's Gate, St. James's Park, London, S.W.1.
Inst. of Metals, J.	Journal of the Institute of Metals. 38, Victoria Street, London, S.W.1.
Inst. Naval Architects, Trans.	Transactions of the Institute of Naval Architects. 2, Adam Street, Adelphi Terrace, London, W.C.2.
Inst. Petroleum Technologists, J.	Journal of the Institution of Petroleum Technologists, Aldine House, Bedford Street, Strand, W.C.2.

ABBREVIATION.	FULL TITLE AND ADDRESS.
Inst. Phys. and Chem. Research, Tokyo, Sci. Papers	Scientific Papers of the Institute of Physical and Chemical Research. Komagome, Hongo, Tokyo, Japan.
Inst. Post Office El. Eng., Papers.	The Institution of Post Office Electrical Engineers, Selected Papers. Engineer-in-Chief's Office, General Post Office (Alder House), London, E.C.1.
International Conference on Large H.T. Systems, Paris, 1933, Papers.	Papers of the International Conference on Large High-Tension Systems, Paris, 1933; Papers. 54, Avenue Marceau, Paris.
I.R.E., Proc.	Proceedings of the Institute of Radio Engineers. 33, West 39th Street, New York, U.S.A.
Iron and Steel Inst., J.	Journal of the Iron and Steel Institute, 28, Victoria Street, London, S.W.1.
Japanese Journ. Math.	Japanese Journal of Mathematics. The Secretary, National Research Council, Imperial Academy House, Ueno Park, Tokyo, Japan.
J. Chem. Phys.	Journal of Chemical Physics. The American Institute of Physics, 11, East 38th Street, New York, U.S.A.
J. de Physique et le Radium	Journal de Physique et le Radium. 12, Place de Laborde, Paris (VIII*).
J. de Radiologie et d'Électrologie.	Journal de Radiologie et d'Électrologie. Masson et Cie, Libraires de l'Académie de Médecine, 120, Boulevard Saint-Germain, Paris.
J. Inst. F.	Journal of the Institute of Fuel. 53, Victoria Street, London, S.W.1.
J. Math. Phys.	Journal of Mathematics and Physics, The Managing Editor, Massachusetts Institute of Technology, Cambridge, Mass., U.S.A.
*J. of Geology	Journal of Geology. University of Chicago Press, 5750, Ellis Avenue, Chicago, U.S.A.
J.O.S.A.	Journal of the Optical Society of America. The American Institute of Physics, 11, East 38th Street, New York, U.S.A.
J. Phys. Chem.	Journal of Physical Chemistry. Williams & Wilkins Co., Mt. Royal and Guilford Avenues, Baltimore, Maryland, U.S.A.
Journ. Sci. Instruments	Journal of Scientific Instruments. The Cambridge University Press, Fetter Lane, London, E.C.4.
Journ. Télégraph. (Now Journ. Télécommunications)	Journal des Télécommunications. Bureau de l'Union Internationale des Télécommunications, Berne, Switzerland.
Junior Inst. Eng., J.	Journal of the Junior Institution of Engineers. 39, Victoria Street, Westminster, S.W.1.
K. Akad. Amsterdam, Proc.	Proceedings of the Koninklijke Akademie van Wetenschappen te Amsterdam. Amsterdam, Holland.
K. Onnes Lab., Leiden, Comm.	Communications of the Kamerlingh Onnes Laboratorium der Rijks-Universiteit te Leiden, Leiden, Holland.
Kolloid-Beihefte	Kolloid-Beihefte. Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany.
Kolloid Zeits.	Kolloid Zeitschrift. Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany.
Kyoto Coll. Eng., Mem.	Memoirs of the Kyoto Imperial University College of Engineering, Kyoto, Japan.
Kyoto Coll. Sci., Mem.	Memoirs of the College of Science, Kyoto Imperial University, Kyoto, Japan.

ABBREVIATION	FULL TITLE AND ADDRESS
Kyushu Univ., Faculty of Eng., Mem.	Memoirs of the Faculty of Engineering, Kyushu Imperial University, Fukuoka, Japan.
Leeds Philosoph. and Lit. Soc., Proc.	Proceedings of the Leeds Philosophical and Literary Society. Prof. R. Whiddington, The University, Leeds, England.
Lick Observat., Bull.	Bulletin of the Lick Observatory, University of California, U.S.A.
Manchester Phil. Soc., Mem.	Memoirs and Proceedings of the Manchester Literary and Philosophical Society. 38, George Street, Manchester, England.
Mechanical Engineering	Mechanical Engineering. The American Society of Mechanical Engineers, 29, West 39th Street, New York, U.S.A.
M.E.E.	Mining Electrical Engineer. Cromwell Buildings, Blackfriars Street, Manchester, England.
Meteorolog. Office, Geophys. Mem. and Prof. Notes	Geophysical Memoirs and Professional Notes of the Meteorological Office. H.M. Stationary Office, Adastral House, Kingsway, London, W.C.2.
Min. Mag.	The Mineralogical Magazine. Humphrey Milford, Oxford University Press, Amen House, Warwick Square, London, E.C.4.
Mines Mag.	Mines Magazine. The Colorado School of Mines, Golden, Colorado, U.S.A.
Monthly Weather Rev.	Monthly Weather Review. Superintendent of Documents, Government Printing Office, Washington, D.C., U.S.A.
M.V. Gazette	Metropolitan-Vickers Gazette. Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester.
Nat. Acad. Sci., Proc.	Proceedings of the National Academy of Sciences. The Home Secretary, The National Academy of Sciences, Constitution Avenue and 21st Street, Washington, D.C., U.S.A.
National Research Council, Bull.	Bulletin of the National Research Council. Publication Office, National Research Council, Constitution Avenue and 21st Street, Washington, D.C., U.S.A.
Nature	Nature. MacMillan & Co., Ltd., St. Martin's Street, London, W.C.2.
Naturwiss.	Naturwissenschaften. Hirschwaldsche Buchhandlung, Unter den Linden 68, Berlin, N.W.7.
N. Cimento	Il Nuovo Cimento. N. Zanichelli, Società Italiana di Fisica, Bologna, Italy.
Observatory	Observatory. Taylor and Francis, Red Lion Court, Fleet Street, London, E.C.4.
Onde Elec.	L'Onde Électrique. Bulletin de la Société des Radioélectriciens, 40, Rue de Seine, Paris (VI ^e).
Optical Soc., Trans.	Transactions of the Optical Society. 1, Lowther Gardens, Exhibition Road, South Kensington, London, S.W.7.
Phil. Mag.	The London, Edinburgh and Dublin Philosophical Magazine and Journal of Science. Taylor & Francis, Red Lion Court, London, E.C.4.
Phot. Indust (Now Fot. Indust.)	Photographische Industrie.
Phot. J.	The Photographic Journal. The General Editor, The Royal Photographic Society, 35, Russell Square, London, W.C.1.
Physica	Physica. Martinus Nijhoff, 9, Lange Voorhout, The Hague, Holland.

ABBREVIATION.	FULL TITLE AND ADDRESS.
Physics	Physics. The American Institute of Physics, 11, East 38th Street, New York, U.S.A.
Physics in Industry	Physics in Industry. The Institute of Physics, 1, Lowther Gardens, Exhibition Road, London, S.W.7.
Phys. Math. Soc. Japan, Proc.	Proceedings of the Physico-Mathematical Society of Japan. Faculty of Science, Tokyo Imperial University, Tokyo, Japan.
Phys. Rev.	The Physical Review. The American Institute of Physics, 11, East 38th Street, New York, U.S.A.
Phys. Soc., Proc.	Proceedings of the Physical Society. 1, Lowther Gardens, Exhibition Road, London, S.W.7.
Phys. Zeits.	Physikalische Zeitschrift. S. Hirzel, Königsstrasse 2, Leipzig, C.I, Germany.
Phys. Zeits. d. Sowjetunion	Physikalische Zeitschrift der Sowjetunion. Tchaikowskaja 16, Charkow, U.S.S.R.
P.O.E.E.J.	The Post Office Electrical Engineers' Journal. Electrical Review, Ltd., Dorset House, Stamford Street, London, S.E.1.
*Popular Astron.	Popular Astronomy. Carleton College, Northfield, Minnesota, U.S.A.
Power	Power. McGraw-Hill Publishing Co., Inc., 330, West 42nd Street, New York, U.S.A., and Aldwych House, London, W.C.2.
Preuss. Akad. Wiss., Berlin, Abhandlungen	Abhandlungen der Preussischen Akademie der Wissenschaften. 38, Unter den Linden, Berlin.
Preuss. Akad. Wiss. Berlin, Ber.	Sitzungsberichte der Preussischen Akademie der Wissenschaften. 38, Unter den Linden, Berlin.
R. Accad. Navale Livorno, Pubbl.	Pubblicazioni dell'Istituto Elettromeccanico delle Comunicazioni della R. Marina, Regia Accademia Navale, Livorno, Italy.
Radio Research, Japan, Reports	Reports of Radio Researches and Works in Japan. The National Research Council of Japan, Imperial Academy House, Ueno Park, Tokyo, Japan.
Radiology	Radiology. The Secretary-Treasurer, The Radiological Society, 607, Medical Arts Building, Syracuse, New York, U.S.A.
Rev. d'Acoustique	Revue d'Acoustique. Les Presses Universitaires de France, 49, Boulevard Saint-Michel, Paris (5°).
Rev. de Mét.	Revue de Métallurgie. 5, Cité Pigalle, Paris (IX°).
Rev. d'Optique	Revue d'Optique Théorique et Instrumentale. 3 & 5, Boulevard Pasteur, Paris (15°).
Rev. Modern Physics	Reviews of Modern Physics. The American Institute of Physics, 11, East 38th Street, New York, U.S.A.
Rev. Sci. Instruments	Review of Scientific Instruments. The American Institute of Physics, 11, East 38th Street, New York, U.S.A.
R.G.E.	Revue Générale de l'Électricité. 12, Place de Laborde, Paris (VIII°).
Rheology (Now combined with Physics)	Journal of Rheology. The American Institute of Physics, 11, East 38th Street, New York, U.S.A.
Ricerca di Ingegneria	Ricerca di Ingegneria, Sindicato Nazionale Fascista Ingegneri, Via Vittorio Veneto 7, Casella Postale 482, Rome (105), Italy.
Roy. Astron. Soc. Canada, J.	Journal of the Royal Astronomical Society of Canada. 198, College Street, Toronto, Canada.

ABBREVIATION.	FULL TITLE AND ADDRESS.
Roy. Astron. Soc., Mem.	Memoirs of the Royal Astronomical Society, Burlington House, London, W.1.
Roy. Astron. Soc., M.N.	Monthly Notices of the Royal Astronomical Society. Burlington House, London, W.1.
Roy. Astron. Soc., M.N., Geophys. Supplement	Monthly Notices, Geophysical Supplement of the Royal Astronomical Society, Burlington House, London, W.1.
Roy. Dublin Soc., Proc.	The Scientific Proceedings of the Royal Dublin Society. Ballsbridge, Dublin, Ireland.
Roy. Inst., Proc.	Proceedings of the Royal Institution of Great Britain. 21, Albemarle Street, London, W.1.
Roy. Irish Acad., Proc.	Proceedings of the Royal Irish Academy. Hodges, Figgis & Co., Dublin, Ireland.
Roy. Meteorolog. Soc., J.	Quarterly Journal of the Royal Meteorological Society. The Royal Meteorological Society, 49, Cromwell Road, South Kensington, S.W.7.
Roy. Meteorolog. Soc., Mem.	Memoirs of the Royal Meteorological Society. The Royal Meteorological Society, 49, Cromwell Road, South Kensington, S.W.7.
Roy. Soc. Arts, J.	Journal of the Royal Society of Arts. G. Bell and Sons, Ltd., York House, Portugal Street, W.C.2.
Roy. Soc. Canada, Trans.	Transactions of the Royal Society of Canada, Ottawa, Canada.
Roy. Soc. Edinburgh, Proc.	Proceedings of the Royal Society of Edinburgh. Robert Grant & Son, 126, Princes Street, Edinburgh, and Williams & Norgate, 28, Little Russell Street, London, W.C.1.
Roy. Soc. Edinburgh, Trans.	Transactions of the Royal Society of Edinburgh. Robert Grant & Son, 126, Princes Street, Edinburgh, and Williams & Norgate, 28, Little Russell Street, London, W.C.1.
Roy. Soc., Phil. Trans.	Philosophical Transactions of the Royal Society of London. Harrison & Sons, Ltd., 44-47, St. Martin's Lane, London, W.C.2.
Roy. Soc., Proc.	Proceedings of the Royal Society of London. Harrison & Sons, Ltd., 44-47, St. Martin's Lane, London, W.C.2.
Roy. Soc. Victoria, Proc.	Proceedings of the Royal Society of Victoria. Ford & Son, Drummond Street, Carlton, Melbourne, Australia.
Roy. Techn. Coll. Glasgow, J.	Journal of the Royal Technical College, Glasgow. Robert Andersen, 142, West Nile Street, Glasgow, C.1, Scotland.
Ryojun Coll. Eng., Mem.	Memoirs of the Ryojun College of Engineering. The Chairman of the Publication Committee. Ryojun College of Engineering, Port Arthur, South Manchuria.
S. African I.E.E., Trans.	Transactions of the South African Institute of Electrical Engineers. Kelvin House, 100, Fox Street, Johannesburg, S. Africa.
Science	Science. Official Organ of the American Association for the Advancement of Science. The Science Press, Grand Central Terminal, New York, U.S.A.
Seismological Soc. of America, Bull.	Bulletin of the Seismological Society of America. The Stanford University Press, Stanford University, California, U.S.A.
Siemens Zeits	Siemens Zeitschrift. Siemens-Schuckertwerke Aktiengesellschaft, Zentral-Verkehrs-Verwaltung, Berlin-Siemensstadt.

LIST OF JOURNALS.

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Abbreviation.	Full Title and Address.
Soc. Belge Élect., Bull.	Bulletin de la Société Belge des Électriciens Librairie Ramlot Frères et Soeurs, 25, rue Grétry, Bruxelles, Belgium.
Soc. Chem. Indust., Japan, J.	Journal of the Society of Chemical Industry, Japan. Yuraku Building, Marunouchi, Tokyo, Japan.
Soc. Eng., J.	Journal of the Society of Engineers, 17, Victoria Street, London, S.W.1.
Soc. Franc. Élect., Bull.	Bulletin de la Société Française des Electri- ciens. 8-14, Avenue Pierre Larousse, à Malakoff (Seine), France.
Soc. Franc. Phot. et Ciné., Bull.	Bulletin de la Société Française de Photo- graphie et Cinématographie. Rue de Clichy 51, Paris.
Soc. Glass Technol., J.	Journal of the Society of Glass Technology, Darnall Road, Sheffield 9, England.
Soc. Române Fiz., Bul.	Buletinul Societatii Române de Fizica. Société Roumaine de Physique, Labora- toire d'Acoustique et Optique, Rue Poincaré 14, Bucarest, Roumania.
Soc. Scien. Fennica, Comm. Phys.-Math.	Societas Scientiarum Fennica, Commenta- tiones Physico-Mathematicae. Kasärngatan 24, Helsingfors, Finland.
Solar Phys. Obs., Cambridge, Ann.	Annals of the Solar Physics Observatory, Cambridge. The Cambridge University Press, Fetter Lane, London, E.C.4.
Terr. Mag	Terrestrial Magnetism and Atmospheric Elec- tricity. The John Hopkins Press, Balti- more, Maryland, U.S.A., and E. G. Allen & Son, Ltd., 14, Grape Street, London, W.C.2.
T.F.T.	Telegraphen- und Fernsprech-Technik. R. Dietze, Regensburgerstrasse 12a, Berlin, W.50.
Tijds. Nederland Radiogenootschap	Tijdschrift van het Nederlandsch Radio- genootschap, 11a, Elzentlaan, Eindhoven, Holland.
Tohoku Math. J.	The Tohoku Mathematical Journal. Tohoku Imperial University, Sendai, Japan.
Tohoku Univ., Sci. & Technol. Reports	Scientific and Technology Reports of the Tohoku Imperial University. Maruzen Co., Ltd., Sendai, Japan.
Tokyo B.D., Sci. Reports.	Science Reports of the Tokyo Bunrika I'ga- ku, Section A. Bunrika Daigaku, Koishi- kawa, Tokyo, and the Maruzen Co., Ltd., 6, Torinichome, Nihombashi-ku, Tokyo, Japan.
Tokyo Univ. Aeronaut. Research Inst., Report	Report of the Aeronautical Research Insti- tute, Tokyo Imperial University, Komaba, Tokyo, Japan.
Tokyo Univ. Earthquake Research Inst., Bull.	Bulletin of the Earthquake Research Insti- tute, Tokyo Imperial University, Tokyo, Japan.
Tokyo Univ., Faculty of Eng., J.	Journal of the Faculty of Engineering, Tokyo Imperial University. Maruzen Co., Ltd., Tori Nichome, Nihonbashiku, Tokyo, Japan.
Tokyo Univ., Faculty of Sci., J.	Journal of the Faculty of Engineering, Tokyo Imperial University, Maruzen Co., Ltd., Tori Nichome, Nihonbashiku, Tokyo, Japan.
Tsing Hua Univ., Sci. Reports	Science Reports of the National Tsing Hua University, Series A. Peiping, China.
Union Géodésique et Géophysique Internationale, Publ.	Publications de l'Union Géodésique et Géo- physique Internationale, Série A. L'Asso- ciation Internationale de Géodésie, Rue d'Anjou, 78, Paris (8°).

ABBREVIATION.	FULL TITLE AND ADDRESS.
Union Obs. S. Africa, Circ.....	Circular of the Union Observatory of South Africa, Johannesburg, S. Africa.
Univ. Durham Phil. Soc., Proc.....	Proceedings of the University of Durham Philosophical Society. E. Patterson, Asst. Librarian, Armstrong College, Newcastle-upon-Tyne, England.
Univ. Nac. La Plata, Estudio Ciencias	Universidad Nacional de La Plata. Contribucion al Estudio de las Ciencias, La Plata, Argentine.
Univ. of Illinois Eng. Exp. Sta., Bull.	Bulletin of the University of Illinois Engineering Experiment Station. University of Illinois, Urbana, Illinois, U.S.A.
*Univ. Pittsburgh, Bull.	Bulletin of the University of Pittsburgh, Pittsburgh, U.S.A.
V.D.I.	Zeitschrift des Vereines Deutscher Ingenieure. V.D.I. Verlag, G.m.b.H., Dorotheenstrasse 40, Berlin, N.W.7.
Washington Acad. Sci., J.	Journal of the Washington Academy of Sciences. Mt. Royal and Guilford Aves., Baltimore, Maryland, U.S.A.
Wireless Engineer	Wireless Engineer and Experimental Wireless. Messrs. Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1.
Wireless World	Wireless World. Dorset House, Stamford Street, London, S.E.1.
Wiss. Veröff. a.d. Siemens-Konzern.	Wissenschaftliche Veröffentlichungen aus dem Siemens-Konzern. J. Springer, Linkstrasse, 23-24, Berlin, W.9.
World Power	World Power, 62, Lincoln's Inn Fields, London, W.C.2.
Zeits. f. angew. Math. u. Mechanik.	Zeitschrift für angewandte Mathematik und Mechanik. Ingenieurwissenschaftliche Forschungsarbeiten. V.D.I.-Verlag G.m.b.H., Dorotheenstrasse 40, Berlin, N.W.7.
Zeits. f. Astrophysik	Zeitschrift für Astrophysik. J. Springer, Linkstrasse 23-24, Berlin, W.9.
Zeits. f. Elektrochem.	Zeitschrift für Elektrochemie und angewandte physikalische Chemie. Verlag Chemie, G.m.b.H., Corneliusstrasse 3, Berlin, W. 35.
Zeits. f. Instrumentenk.	Zeitschrift für Instrumentenkunde. J. Springer, Linkstrasse 23-24, Berlin, W.9.
Zeits. f. Krist.	Zeitschrift für Kristallographie, Kristallgeometrie, Kristallphysik, Kristallchemie. Akademische Verlagsgesellschaft m.b.H., Markgrafenstrasse 6, Leipzig, C.1, Germany.
Zeits. f. Metallkunde	Zeitschrift für Metallkunde. V.D.I.-Verlag, G.m.b.H., Dorotheenstrasse 40, Berlin, N.W.7.
Zeits. f. phys. Chem., Abt. A. & B.	Zeitschrift für physikalische Chemie (Abteilungen A and B). Akademische Verlagsgesellschaft m.b.H., Markgrafenstrasse 6, Leipzig, C.1, Germany.
Zeits. f. Physik.	Zeitschrift für Physik. J. Springer, Linkstrasse 23-24, Berlin, W.9.
Zeits. f. techn. Physik	Zeitschrift für technische Physik. J. A. Barth, Salomonstrasse 18a, Leipzig, C.1, Germany.
Zeits. f. wiss. Phot.	Zeitschrift für wissenschaftliche Photographie, Photophysik und Photochemie. J. A. Barth, Salomonstrasse 18a, Leipzig, C.1, Germany.